REMARKS

Claims 12-24 are pending. By this Amendment, no claims are cancelled, claims 12 and 19 are amended and no new claims are added.

Claim Objections

The Office Action objected to claim 12 indicating that the word "variable" is unnecessary and confusing. While not acquiescing to the objection, Applicant has amended claim 12 to delete the word "variable." Applicant believes that the reason that the word "variable" was in the claim originally will become clear with the explanation below. Applicant respectfully requests that the Examiner withdraw the objection.

35 U.S.C. § 112

The Office Action rejected claims 18 and 24 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. Applicant respectfully traverses the rejection. As will be explained further below, the claims are fully supported by the specification and fully meet the written description requirement.

The Office Action rejected claims 13, 18, 20 and 24 under 35 U.S.C. § 112, second paragraph, as being indefinite. Applicant respectfully traverses the rejection as will be further explained below. Applicant respectfully requests that the Examiner withdraw the rejection.

The invention relates to material treatment by use of a laser apparatus. One example application of the invention would be in the use of a laser keratome in laser refractive surgery. The laser apparatus of the invention includes a source of laser radiation which generates pulsed laser radiation. The pulsed laser radiation is directed to a variable deflecting device, for

example, an oscillating mirror scanner which deflects the pulse laser radiation and creates a moving scan pattern. As a result of the scanner directing the laser beam, the pulsed laser radiation is applied to different selectable locations within the material being treated to generate optical breakthroughs. These optical breakthroughs are used to form a cut within the material by generating multiple optical breakthroughs located adjacent to each other. Each optical breakthrough separates tissue and the series of optical breakthroughs generated in the material join to create a cut surface within the material. To generate the cut surface, the pulse laser radiation is directed into the material while the deflecting device shifts the focus of the laser energy through and within the material. Because the laser energy is both pulsed by the laser energy generating device and moved in the scanned pattern within the treated material, there is a clear connection between the frequency of the laser pulses, that is, how many laser pulses are generated per second and the speed of the deflecting device. As the deflecting device, for example a scanner, usually employs an oscillating mirror, the deflecting speed is connected with the operating or oscillating frequency of the deflecting device. Thus, there is a frequency of pulse repetition and also a frequency at which the deflecting device for example, an oscillating mirror is deflected.

Both the operating frequency (the deflecting speed) of the deflecting device and the repetition rate of the laser pulse generator influence the gap between consecutive optical breakthroughs that are made in the material. If the laser pulse repetition rate is held constant, altering the speed of deflection of the deflecting device narrows or widens the gap between two consecutive optical breakthroughs made by two consecutive laser pulses. On the other hand, it is possible to alter the laser pulse repetition rate while holding the speed of deflection (the

frequency of the scanner) constant. However, there are certain limitations to changing the pulse repetition rate while holding the frequency of the scanner constant. When using laser systems which have a passively mode-synchronized oscillator, it requires significantly greater effort to adjust the pulse repetition rate than to modify the operating speed of the deflecting device, and of course the operating speed of the deflecting device is limited by physical factors.

These circumstances lead to limitations in overall speed because it is most feasible to establish a constant pulse repetition rate of the laser radiation, the rate being selected such that in combination with the maximum operating speed of the scanner system, the smallest required gap between optical breakthroughs can be achieved. To obtain wider gaps between the optical breakthroughs, which are usually required to generate certain portions of a cut surface, the deflecting speed of the deflecting device is then lowered below the maximum possible value. In summary, the overall time to generate a cut is govern by the maximum deflecting speed of the deflecting device and the minimum optical breakthrough gap required to generate a desired cut surface.

The invention overcomes this limitation of the prior art by employing a pulse picking device in the beam path between the pulsed laser generator and material in which the cut surface is to be generated. The pulse picking device of the invention allows one to design the laser system such that the pulse repetition rate is significantly higher than the repetition rate value which combines with the maximum deflecting speed of the deflecting device to create the minimum gap between optical breakthroughs required. Without the pulse picking device of the invention, the repetition rate would result in the gap between consecutive optical breakthroughs

being far too narrow. The pulse picking device renders some of the laser pulses ineffective to generate optical breakthroughs in the treated material.

Since the pulse picking device influences the laser pulses such that only a remaining subset of not selected laser pulses that arise from the source of pulsed laser radiation can cause optical breakthroughs in the material the effective rate of laser pulses which are able to generate optical breakthroughs in the material is reduced by the invention's application of the pulse picking device. Through application of the pulse picking device, the inventive apparatus provides a third option for controlling the creation of optical breakthroughs in addition to adjusting the laser pulse repetition rate and adjusting the deflecting speed or frequency of the deflecting device. This permits the use of a significantly greater laser beam pulse repetition rate. If the now used higher pulse repetition rate would result in two optical breakthroughs to close together even with the deflecting device operating at maximum deflecting speed or frequency, the pulse picking device alters non-sequential pulses of the pulse laser radiation to make them ineffective to create optical breakthroughs. Non-sequential pulses of the laser radiation are pulses which are not directly consecutive, that is, pulses that do not directly follow one another.

With regard to the Office Action's rejection over the lack of clarity of "non-sequential" pulses, sequential pulses are pulses of laser radiation which are directly consecutive. Non-sequential pulses are pulses of laser radiation that are not directly consecutive. In other words, non-sequential pulses are separate from each other by intervening pulses of laser radiation. The German word "nicht aufeinanderfolgend," which was translated to the term "non-sequential" could also be translated as "non-consecutive." In accordance with the invention to reduce the effective laser pulse frequency at the treated material, the pulse picking device selects non-

consecutive laser pulses and alters them so that they cannot generate optical breakthroughs in the material.

The originally filed English specification provides written description of these aspects of the invention throughout the specification, for example, from Page 3, Line 33 to Page 6, Line 5.

With this explanation, Applicant believes that the rejections under § 112, have been fully overcome. Applicant respectfully requests that the Examiner withdraw the rejections.

35 U.S.C. § 103

The Office Action rejected claims 12-24 under 35 U.S.C.§ 103(a) as being unpatentable over Swinger et al. (U.S. Patent 6,325,792). The Office Action indicates that the device of Swinger includes a beam intensity controller identified by Reference Numeral 112 in Fig. 6, which allows adjustment of the power of the pulses. It should be understood that the beam intensity controller of Swinger is used to adjust the laser pulse energy such that a treatment affect in the treated material reliably occurs. The beam intensity controller as disclosed by Swinger is simply a means to adjust the laser beam power to provide a proper laser beam power for treatment. It would be a contradiction to the teachings of Swinger to use the beam intensity control to render some but not all of the pulses ineffective to create optical breakthroughs and to reduce the effect of pulse frequency as the invention does. In particular, Swinger does not disclose or suggest that the beam intensity controller is used or even capable of treating some laser pulses differently than others. There is nothing disclosed or suggested in Swinger regarding selecting a subset of pulses to be treated differently than others. To further emphasize this aspect of the invention, claim 12 and 19 have been amended to recite the limitations that the pulse picking device influences selected laser pulses such that only a remaining subset of not

selected laser pulses can causes optical breakthroughs in the material. As such, claims 12 and 19 as amended are patentable over Swinger. Claims 13-18 depend from claim 12 and should be patentable for at least the same reasons as claim 12. Claims 20-24 depend from claim 19 and should be patentable for at least the same reasons as claim 19. Applicant respectfully requests that the Examiner withdraw the rejections.

With regard to the rejection of claims 19-21 on the basis of *Ex Parte Pfeiffer*, the Board of Patent Appeals and Interferences and the Court of Appeals for the Federal Circuit have both addressed rejections on this basis. In *Ex Parte Tuma* the BPAI in addressing a rejection on the basis of *Ex Parte Pfeiffer* stated "when determining obviousness all of the limitations of the claims must be considered. There are no per se rules." Appeal 2006-2308. The Board then cited *In Re Ochiai,* 37 USPQ 2d, 1127, 1133 (Fed. Cir. 1995). The Federal Circuit held:

> The use of per se rules, while undoubtedly less laborious than a searching comparison of the claimed invention, including all its limitations with the teachings of the prior art, flouts section 103 and the fundamental case law applying it. *Per se* rules that eliminate the need for fact specific analysis of claims and prior art may be administratively convenient for PTO Examiners and the Board. Indeed, they have been sanctioned by the Board as well. But reliance on *per se* rules of obviousness is legally incorrect and must cease. Any such administrative convenience is simply inconsistent with section 103, which, according to *Graham* and its progeny, entitles an applicant to issuance of an otherwise proper patent unless the PTO

> establishes that the invention *as claimed* in the application is obvious over cited prior art, based on the specific comparison of that prior art with claim limitations. We once again hold today that our precedents do not establish any *per se* rules of obviousness, just as those precedents themselves expressly declined to create such rules. Any conflicts as may be perceived to exist derive from an impermissible effort to extract *per se* rules from decisions that disavow precisely such extraction.

As such, the citation to *Ex Parte Pfeiffer* does not support a rejection for obviousness of claims 19-24 in the absence of a fact specific comparison with the prior art. Therefore, a prima facie case of obviousness of claims 19-24 has not been established. Thus, claims 19-24 are patentable for at least this additional reason. Applicant respectfully requests that the Examiner withdraw the rejection.

In view of the foregoing, it is submitted that this application is in condition for allowance. Favorable consideration and prompt allowance of the application are respectfully requested.

The Examiner is invited to telephone the undersigned if the Examiner believes it would be useful to advance prosecution.

Respectfully submitted,

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